



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/670,520	09/26/2000	Wakako Moriyama	197802US2S	4460

22850 7590 12/17/2002

OBLON SPIVAK MCCLELLAND MAIER & NEUSTADT PC  
FOURTH FLOOR  
1755 JEFFERSON DAVIS HIGHWAY  
ARLINGTON, VA 22202

EXAMINER

LEE, GRANVILL D

ART UNIT

PAPER NUMBER

2825

DATE MAILED: 12/17/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/670,520

Applicant(s)

MORIYAMA ET AL.

Examiner

Granvill D Lee, Jr

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 September 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4, 7, 10, 12, 13-18, 20 and 22 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

- 5) ☒ Claim(s) 13-18, 20 and 22 is/are allowed.

- 6) ☒ Claim(s) 1-4, 7, 10 and 12 is/are rejected.

- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Response to Applicant's Argument***

After review of applicant's amendments and comments, the examiner finds such arguments unpersuasive. Applicant's comments as to Gardener et al. and Rama et al. are well taken, however in further review of the prior art, the examiner has found that Kusunoki et al. and Rama et al. read upon applicant's claimed invention. As these are a new grounds for rejection, but the following rejections are not to be considered final.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 7, 10 and 12, are rejected under 35 U.S.C. 103(a) as being unpatentable over Kusunoki et al. (US Pat. 6,335,549) in view of Rama et al. (Pub.).

In view of claims 1 and 10, Kusunoki et al. makes a semiconductor memory device by forming a gate insulating film (Fig. 22 #22b) in oxynitride (oxidation) form on a substrate surface from 800-1100 degrees C. Next, the

layer deposited to form the electrodes (Fig. 23) are etched down to the surface of the substrate (Fig. 24) to leave it exposed, subsequently, impurity diffused regions are later formed (Fig. 29 #6 and #37) under the surface. However, Kusunoki et al. fails to include a vapor method to help form the gate insulating film.

Rama et al. uses a two-step process, including a vapor technique to form oxynitride films. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the teachings of Kusunoli et al. with those of Rama et al. to incorporate a better method of obtaining a layer with superior qualities. Rama et al. found that gate dielectrics with nitric oxide were of excellent quality, but using the vapor method at various time periods, resulted in an excellent layer with more nitrogen at the interface (Fig. 1 a-c).

In view of claims 2 and 7, Kusunoki et al. uses a reoxidized (twice oxidizing a nitrified layer) nitrided (RNO) film layer (Col. 7 lines 21-25) to cover the substrate.

In view of claims 3 and 4, Kusunoki et al. uses an anisotropic hydrofluoric (HF) acid to perform the etch and expose the substrate (Pg 2883 3<sup>rd</sup> para.).

In continued view of claim 12, Kusunoki et al. reoxidizes or post-oxidizes a nitride layer in making of a semiconductor device (Col. 7 lines 20-40).

***Allowable Subject Matter***

Claims 13-18, 20 and 22 allowable.

***Contact Information***

Any inquiry concerning this communication or earlier communications for the examiner should be directed to Granvill Lee whose telephone number is (703) 306-5865. The examiner can be normally reached on Monday thru Thursday from 7:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are not successful, the examiner's supervisor, Matthew Smith can be reached on (703) 308-1323. The fax phone number for this group is (703) 308-7722.

Any inquiry of a general nature relating to status or otherwise should be directed to the receptionist whose telephone number is 703-308-1782.

Examiner  
Granvill Lee  
Art Unit 2825

GI  
12/5/02



**MATTHEW SMITH**  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800